GENERAL MECHANICAL NOTES

1. ALL EQUIPMENT SHALL BE SELECTED FOR SITE CONDITIONS.
2. LEGENDS ARE COMPOSED OF STANDARD SYMBOLS AND ARE PERTINENT TO THE CONDITIONS ON THIS SET OF DRAWINGS. ADDITIONAL LEGENDS AND/OR ANOTHER LEGEND SHEET MAY APPEAR IN THIS SET OF DRAWINGS TO INDICATE SPECIFIC CONDITIONS.
3. PLAN AND SECTION DRAWINGS ARE BASED ON SPECIFIC BASIS-OF-DESIGN EQUIPMENT MODELS. LAYOUT OF EQUIPMENT, CONCRETE PADS, DUCT CONNECTIONS AND PIPING EQUIPMENT SHALL BE VERIFIED AND ADJUSTED BY CONTRACTOR TO MATCH ACTUAL EQUIPMENT FURNISHED. PHYSICAL CONSTRAINTS MAY PRECLUDE PURCHASE OF CERTAIN EQUIPMENT MODELS. PLACEMENT OF ACTUAL EQUIPMENT FURNISHED SHALL NOT VIOLATE CODE RELATED SPACE REQUIREMENTS AND MANUFACTURER-RECOMMENDED MAINTENANCE SPACE. UNLESS INDICATED OTHERWISE, A 6 INCH HIGH CONCRETE HOUSEKEEPING PAD SHALL BE PROVIDED FOR ALL FLOOR MOUNTED MECHANICAL EQUIPMENT, UNLESS OTHERWISE NOTED.
4. ALL ELEVATIONS SHOWN ARE ABOVE FINISHED FLOOR, UNLESS NOTED OTHERWISE.
5. ALL PIPING SYSTEMS AND DUCT SYSTEMS SHALL HAVE MARKERS THAT INDICATE FLOW DIRECTION AND SERVICE. ALL PIPING IDENTIFICATION SHALL CONFORM TO MIL-STD 101. PROVIDE DUCT MARKERS OR STENCILED SIGNS. LETTERING FOR DUCTWORK SHALL BE MIN 1-1/2 INCHES HIGH.
6. BEFORE EXECUTING ANY WORK ON A BUILDING WITH HEMP/EMI, THE CONTRACTOR SHALL COORDINATE WITH THE HEMP SUBSYSTEM SPECIALIST.
7. THE EXACT LOCATION AND SIZE OF EQUIPMENT PADS, ROOF / WALL OPENINGS AND MOUNTING FRAMES SHALL BE COORDINATED IN THE FIELD WITH THE ACTUAL EQUIPMENT FURNISHED.
8. ACCESS PANEL IDENTIFICATION: ACCESS POINTS SHALL BE PERMANENTLY IDENTIFIED ON EXTERIOR BY A LABEL, WITH LETTERING NOT LESS THAN 1 INCH HIGH.
9. AVOID INSTALLING ANY PIPING OR EQUIPMENT ABOVE THE ELECTRICAL PANELS OR EQUIPMENT. WHEN PIPING MUST RUN ABOVE ELECTRICAL EQUIPMENT, APPROVAL OF THE OWNER MUST BE OBTAINED TO INSTALL SHEET METAL TROUGH BETWEEN EQUIPMENT AND PIPING.
10. PROVIDE PERMANENT IDENTIFICATION AND AREA SERVED DESCRIPTION ON ALL EQUIPMENT.
11. DO NOT LOCATE MECHANICAL WORK IN ELECTRICAL OR COMMUNICATION ROOMS, EXCEPT FOR RUNOUTS SPECIFICALLY SERVING THE RESPECTIVE ROOM.
12. THE SHORT CIRCUIT RATING OF ELECTRICAL EQUIPMENT AND/OR DEVICES THAT IS FED FROM A BRANCH CIRCUIT OF PANELBOARDS OR MOTOR CONTROL CENTERS SHALL HAVE A SHORT CIRCUIT RATING EQUAL TO OR LARGER THAN THE SHORT CIRCUIT RATING OF ITS UPSTREAM PANELBOARDS OR MOTOR CONTROL CENTERS.
13. EQUIPMENT SCHEDULE DATA IS FOR EACH EQUIPMENT TAG AND NOT THE TOTAL OF ALL TAGS.
14. ALL HOT WATER SYSTEMS SHALL BE PROVIDED WITH 50% PROPYLENE GLYCOL AND ALL CHILLED WATER SYSTEMS SHALL BE PROVIDED WITH 40% PROPYLENE GLYCOL WITH CORROSION INHIBITORS.
15. PROVIDE SPECIFIC SAFETY WARNING LABELS ON ALL EQUIPMENT AND SYSTEMS WITH VISUAL ICONS AND PICTOGRAMS WITH COLOR CODING AND SIGNAL WORDS IN ACCORDANCE WITH APPLICABLE SECTIONS OF ANSI-Z535. THE SIGNS, LABELS AND MARKINGS ARE TO BE AS PERMANENT AS THE NORMAL LIFE EXPECTANCY OF THE EQUIPMENT ON WHICH THEY ARE AFFIXED. GUARDS, BARRIERS, AND ACCESS DOORS, COVERS OR PLATES ARE TO BE MARKED TO INDICATE THE HAZARD THAT MAY BE REACHED UPON REMOVAL OF SUCH DEVICES. SAFETY WARNING LABELS ARE TO BE SIZED FOR LEGIBILITY IN ACCORDANCE WITH THE LABELING GUIDELINES GIVEN IN MIL-STD-1472G SECTION 5.4.

GENERAL PIPING NOTES

1. PIPING IS SHOWN FOR INFORMATION AND GENERAL ROUTING. THE CONTRACTOR SHALL PROVIDE FINAL ROUTING FOR ALL PIPING AND SHALL PROVIDE SHOP DRAWINGS THAT INCLUDE: EXACT DIMENSIONED ROUTING OF ALL PIPE, PIPE SIZE, DIMENSIONED TIE-IN LOCATIONS AT EXISTING PIPING, AND FIRE WALL PENETRATION DETAILS. THE CONTRACTOR SHALL AVOID INTERFERENCES WITH OTHER PIPING, EQUIPMENT, CODE REQUIRED CLEARANCES, AND THE WORK OF OTHER DISCIPLINES. FIELD ROUTED LIQUID-FILLED PIPING SHALL NOT BE ROUTED ABOVE ELECTRICAL OR ELECTRONIC EQUIPMENT.
2. ALL THREADED PIPING (VALVES, EQUIPMENT, AND FITTINGS) SHOWN ON THE DRAWING AS FITTING TO FITTING AND NOT DIMENSIONED SHALL BE INSTALLED USING 3 INCHES LONG PIPE NIPPLES BETWEEN EACH ITEM UNLESS NOTED OTHERWISE.
3. PIPING AND SUPPORTS SHALL NOT INTERFERE WITH EQUIPMENT MAINTENANCE ACCESS OR PULL SPACE. PROVIDE PIPE SUPPORTS.
4. A SUFFICIENT NUMBER OF UNIONS FOR THREADED PIPING SHALL BE INSTALLED TO ALLOW MAINTENANCE OR REMOVAL OF VALVES OR EQUIPMENT WITHOUT UNDUE DISTURBANCE OF INTER-CONNECTING PIPE. DRAWINGS DO NOT INDICATE ALL REQUIRED UNIONS.
5. EQUIPMENT PIPING CONNECTION SIZES AND CONFIGURATION SHOWN ON DRAWINGS ARE ESTIMATED AND SHALL BE ADJUSTED FOR THE ACTUAL EQUIPMENT FURNISHED.
6. ALL EXPOSED PIPING SHALL BE PAINTED.
7. PIPING AND INSTRUMENT DIAGRAMS INDICATE LINE SIZE CHANGE EITHER BY REDUCER SYMBOL OR BY INDICATING BRANCH LINE SIZE. ALL REDUCERS ARE NOT SHOWN, PROVIDE PIPE REDUCERS WHERE CONTROL VALVE OR EQUIPMENT NOZZLE SIZE IS DIFFERENT THAN PIPE SIZE.
8. ALL SOLDER SHALL BE LEAD-FREE FOR POTABLE AND NON-POTABLE WATER SYSTEMS.
9. ALL BALL VALVES 2" AND SMALLER SHALL BE FULL PORT BALL VALVES.
10. ALL REFRIGERANT PIPING AND COMPONENTS SHALL BE SIZED AND ROUTED PER MANUFACTURERS RECOMMENDATIONS. EQUIPMENT MANUFACTURER SHALL PROVIDE SCHEMATIC SYSTEM DESIGN. CONTRACTOR SHALL PROVIDE INSTALLATION-SPECIFIC ISOMETRIC LAYOUT DRAWINGS FOR APPROVAL BY MANUFACTURER.
11. PROVIDE ALL PIPING WITH VALVED AND CAPPED HIGH POINT VENTS AND LOW POINT DRAINS TO ALLOW VENTING, FILLING, AND DRAINING ALL PIPE SECTIONS. UNLESS OTHERWISE INDICATED, SIZE SHALL BE 1" FOR PIPE 6" DIA AND LARGER, 3/4" FOR PIPE 3/4" THROUGH 4" DIA, AND LINE SIZE FOR PIPE SMALLER THAN 3/4" DIAMETER. DRAWINGS DO NOT INDICATE ALL REQUIRED VENTS AND DRAINS.
12. PROVIDE ALL ITEMS SHOWN ON PIPING AND INSTRUMENT DIAGRAMS, WHETHER OR NOT VISIBLE ON PIPING PLAN AND SECTION DRAWINGS. P&ID'S TAKE PRECEDENCE OVER PIPING PLAN AND SECTION DRAWINGS.
13. ALL VALVE OPERATORS INCLUDING CONTROL VALVE AND MOTOR OPERATED VALVE OPERATORS SHALL BE ORIENTED PER MANUFACTURER'S INSTRUCTIONS AND TO AVOID INTERFERENCE WITH OTHER PIPING AND EQUIPMENT.
14. PIPING SYSTEMS SHALL BE INSULATED. PIPING SYSTEMS GENERALLY REQUIRING INSULATION INCLUDE (BUT ARE NOT LIMITED TO) THE FOLLOWING CHILLED WATER, HEATING WATER, HIGH AND LOW TEMP. ELECTRONICS COOLING WATER, AND DOMESTIC HOT WATER.
15. HYDRONIC WATER RETURN LINES SHALL NOT HAVE BULLHEAD CONNECTIONS.
16. HYDRONIC PIPING SHALL HAVE MANUAL AIR VENTS AT ALL HIGH POINTS. PROVIDE DRAIN VALVES WITH REMOVABLE PLUG AT THE BOTTOM OF VERTICAL PIPE RISERS AND AT ALL LOW POINTS TO DRAIN PIPES.
17. FOR PLUMBING PIPING DETAILS REFER TO PLUMBING SERIES DRAWINGS.
18. FOR PIPING DETAILS, REFER TO SHEETS MP900501B THRU MP900505B.
19. FOR WELL PUMPS AND PROCESS PIPING REFER TO D-900101B THRU D-900102B.

GENERAL HVAC NOTES

1. ALL HVAC PENETRATIONS IN FIRE WALLS SHALL HAVE FIRE SMOKE DAMPERS. ALL FIRE DAMPERS, SMOKE DAMPERS, AND FIRE/SMOKE DAMPERS SHALL BE INSTALLED IN ACCORDANCE WITH SHEET METAL AND AIR CONDITIONING NATIONAL ASSOCIATION (SMACNA) SMOKE, AND RADIATION DAMPER INSTALLATION GUIDE FOR HVAC SYSTEMS, UL, IBC, AND DAMPER MANUFACTURER'S RECOMMENDATIONS
2. ALL RECTANGULAR DUCT ELBOWS SHALL HAVE TURNING VANES UNLESS NOTED OTHERWISE. ALL UNEQUAL TURNING VANES SHALL HAVE SINGLE-THICKNESS TURNING VANES WITH TRAILING EDGE. NOT ALL TURNING VANES ARE INDICATED ON THE DRAWINGS.
3. ALL DUCT SHALL BE SEAL CLASS A IN ACCORDANCE WITH SMACNA HVAC DUCT CONSTRUCTION STANDARDS UNLESS NOTED OTHERWISE.
4. ALL DUCT SIZE DIMENSIONS INDICATED ON THE DRAWINGS ARE CLEAR INSIDE DIMENSIONS.
5. ALL HVAC PENETRATIONS EQUAL OR GREATER THAN 96 SQUARE INCHES AND ALONG THE SECURE BOUNDARY SHALL HAVE SECURITY MAN BARS AND INSPECTION PORT INSTALLED ON THE SECURE SIDE OF THE WALL.
6. MAXIMUM LENGTH OF FLEX DUCT SHALL BE 6 FEET.
7. DUCT SMOKE DETECTORS WHERE SHOWN ON PLANS OR DETAILS SHALL BE INSTALLED PER NFPA 72E, 90A AND MANUFACTURER'S REQUIREMENTS. ACCESS PANEL TO THE DETECTORS SHALL BE PROVIDED.
8. CONTRACTOR CAN USE EQUIVALENT ROUND DUCTWORK IN LIEU OF RECTANGULAR DUCTWORK, WHERE SPACE IS AVAILABLE.
9. DUCT AND PLENUM ACCESS PANEL/DOORS SHALL BE PIANO HINGED, GASKETED AND DOUBLE SASH LOCKED.
10. CEILING DIFFUSER, RETURN AND EXHAUST GRILLE SIZES SHOWN ON PLANS AND IN EQUIPMENT SCHEDULES ARE NECK SIZE. USE LONG RADIUS ELBOW FITTING WHEN PHYSICAL SPACE ALLOWS. SHORT RADIUS ELBOW FITTINGS SHALL HAVE TURNING VANES. 90 DEGREE SQUARE ELBOWS WITH TURNING VANES SHALL ONLY BE USED WHERE THE RADIUS ELBOW INSTALLATION IS NOT POSSIBLE DUE TO SPACE LIMITATION. NUMBER AND LOCATION OF TURNING VANES (SPLITTERS) SHALL BE PER SMACNA.
11. PROVIDE MANUAL VOLUME DAMPERS IN EACH BRANCH OF RETURN AIR, EXHAUST AIR, SUPPLY AIR DUCT AND DOWNSTREAM OF VAV BOXES. PROVIDE ADEQUATE NUMBER OF DAMPERS AS REQUIRED FOR COMPLETE BALANCING WITHOUT THE USE OF OPPOSED BLADE DAMPERS PROVIDED WITH THE DIFFUSERS AND / OR REGISTERS.
12. INSTALLATION SHALL ACCOMMODATE READY ACCESS TO DAMPERS, COILS AND OTHER DEVICES. ACCESS DOORS SHALL BE INSTALLED TO PROVIDE ADEQUATE CLEARANCES FOR DIRECT ACCESS.
13. ALL VOLUME DAMPERS ABOVE GYPSUM BOARD HARD CEILINGS SHALL BE FURNISHED WITH REMOTE DAMPER OPERATOR.
14. UNLESS OTHERWISE NOTED, ROUTE ALL DUCTWORK AND PIPING ABOVE CEILINGS. ROUTE ALL DUCTWORK AND PIPING AS HIGH AS POSSIBLE IN AREAS WITHOUT CEILINGS.
15. UNLESS OTHERWISE NOTED, PROVIDE DUCT RUNOUTS TO TERMINAL UNITS SAME SIZE AS TERMINAL UNIT INLET. INSTALL CALIBRATED BALANCING VALVES AND VENTURIS WITH A MINIMUM UNRESTRICTED STRAIGHT RUN OF 5 PIPE DIAMETERS UPSTREAM AND 3 PIPE DIAMETERS DOWNSTREAM.
16. ALL OUTSIDE AIR INTAKES, RELIEF AIR, AND EXHAUST DAMPERS SHALL BE LOW LEAKAGE DAMPERS. THE LOW LEAKAGE DAMPERS WILL HAVE MAXIMUM LEAKAGE RATES OF 3 CFM/SQ FEET WITH A DIFFERENTIAL PRESSURE OF 1" WG ACROSS THE DAMPER.
17. FOR HVAC DETAILS, REFER TO SHEETS MH900501B THRU MH900506B.
18. ALL DUCTWORK EXCEPT NOTED BELOW SHALL BE GALVANIZED STEEL. USE STAINLESS STEEL EXHAUST DUCT FOR THE FIRST 15 FEET OF SHOWER EXHAUST AND OUTDOOR DUCTWORK. GRILLES IN SHOWER SHALL BE OF STAINLESS STEEL.
19. PROVIDE WAVEGUIDE CLEANING PORT FOR ALL DUCTED EMI WAVEGUIDE.

GENERAL BMS NOTES

1. INSTRUMENT PIPING CONNECTIONS ARE NOT DIMENSIONED ON THE DRAWINGS. THE CONNECTION LOCATIONS SHOWN ARE INTENDED TO SERVE AS A GENERAL GUIDE ONLY TO ILLUSTRATE THE DESIRED LOCATIONS OF THE CONNECTIONS. FOR INSTRUMENT CONNECTIONS NOT IDENTIFIED ON PIPING DRAWING REFER TO PIPING OR AIRFLOW AND INSTRUMENTATION DIAGRAMS FOR RELATIVE LOCATIONS. THE CONTRACTOR SHALL AVOID INTERFERENCE WITH OTHER INSTRUMENT CONNECTIONS, PIPING, EQUIPMENT, AND THE WORK OF OTHER DISCIPLINES. WHERE PRESSURE AND TEMPERATURE CONNECTIONS ARE SHOWN ADJACENT TO EACH OTHER, A MINIMUM DISTANCE OF 300 mm. SHALL BE MAINTAINED BETWEEN INSTRUMENT CONNECTIONS WHERE POSSIBLE.
2. ALL PRESSURE INSTRUMENTATION SHALL BE FOR 3/4" DIA PIPING. TEMPERATURE TAPS SHALL BE SUITABLE FOR THERMOWELL, IN NO CASE LESS THAN 3/4". ALL PRESSURE INSTRUMENTATION SHALL BE PROVIDED WITH A 3/4" ISOLATION BALL VALVE.
3. INSTRUMENTATION (FOR EXAMPLE, PI, TI, PDI) IS NOT ALL SHOWN ON PLAN DRAWINGS. CONTRACTOR SHALL PROVIDE INSTRUMENTATION AS INDICATED ON CONTROL DIAGRAMS AND SHALL LOCATE DEVICES SUCH THAT A PERSON CAN EASILY READ GAUGE WHILE STANDING ON FLOOR.
4. THERMOSTATS AND ROOM TEMPERATURE TRANSMITTERS SHALL BE MOUNTED 5 FEET AFF UNLESS NOTED OTHERWISE. SENSORS MOUNTED ON THE EXTERIOR WALL SHALL HAVE INSULATION, BLOCK BACKING.
5. FOR THERMOSTATS AND ROOM TEMPERATURE TRANSMITTER TAGS REFER TO INSTRUMENTATION DRAWINGS.
6. POINT LIST PROVIDED ARE MINIMUM REQUIRED POINTS. PROVIDE ADDITIONAL POINTS AND INSTRUMENTATION TO PROVIDE COMPLETE OPERABLE SYSTEM IN COMPLIANCE WITH THE SEQUENCE OF OPERATIONS AND DIAGRAMS THE BMS SHALL TREND EVERY 15 MINUTES (INITIAL SETTING) FOR EACH POINT IDENTIFIED IN THE POINT LIST TO BE TRENDED, UNLESS NOTED OTHERWISE. ALL SET POINTS SHALL BE ADJUSTABLE AT BMS LOCALLY AND REMOTELY AT BUILDING 800.
7. CONTROL/POWER WIRING REQUIRED BUT NOT SHOWN FOR AND NOT LIMITED TO THERMOSTATS, VARIABLE FREQUENCY DRIVE CONTROLS, EQUIPMENT MANUFACTURER CONTROL PANELS, DAMPER MOTORS, VALVES, SENSING DEVICES (TEMPERATURE, PRESSURE, HUMIDITY, LEVEL, FLOW, VOLUME, ON-OFF, FIRE ALARM DEVICES) AND OTHER MECHANICAL/ FIRE PROTECTION/PLUMBING EQUIPMENT REQUIRING CONTROL WIRING SHALL BE SUPPLIED AND INSTALLED TO PROVIDE A COMPLETE AND USABLE FACILITY. INSTALL CONTROL WIRING IN METAL CONDUITS AS PER SPECIFICATIONS.
8. THE BMS SHALL BE PROVIDED WITH INPUT AND OUTPUT HARDWARE TO FORM A COMPLETE AND INTEGRATED SYSTEM PER SEQUENCE OF OPERATION AND I/O POINT LIST.

GENERAL PIPE/DUCT NOTES

1. ALL PIPE SUPPORTS SHALL CONFORM TO THE REQUIREMENTS OF MSS-SP-58 AND MSS-SP-69 AND AS SPECIFIED.
2. SUPPORTS SHALL BE CAPABLE OF RESISTING HORIZONTAL AND VERTICAL FORCES INDUCED BY EARTHQUAKE IN ADDITION TO NORMAL LOADS DUE TO WEIGHT OF PIPE, FITTINGS, WEIGHT OF FLUID, INSULATION, AND LOADS DUE TO THERMAL EXPANSION OR CONTRACTION. DESIGN OF SEISMIC BRACING SHALL CONFORM TO CONSTRUCTION SPECIFICATION.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN, FABRICATION, AND INSTALLATION OF ALL PIPE SUPPORTS AND SEISMIC BRACING.
4. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL SUPPLEMENTARY STEEL REQUIRED FOR PIPE SUPPORT INSTALLATION.
5. CONTROL VALVE AND MOTOR OPERATED VALVE OPERATORS HEAVIER THAN 20 LBS. SHALL BE BRACED FOR SEISMIC LOADS.
6. ALL PIPE SUPPORTS AND SEISMIC BRACING REGARDLESS OF PIPE SIZE AND WHETHER INDICATED ON DRAWINGS OR NOT, TO MEET SPECIFIED PERFORMANCE REQUIREMENT. PER SPEC SECTION 13 48 00.01 10.
7. ENTIRE SCOPE OF SUPPORT LOCATION, DESIGN, FABRICATION, AND INSTALLATION OF HVAC DUCTS, PIPING, AND EQUIPMENT SHALL BE CONTRACTOR'S RESPONSIBILITY. HVAC DUCTS AND PIPE SUPPORTS (EXCLUDING FIRE PROTECTION) SHALL BE IN ACCORDANCE WITH THE LATEST SMACNA PUBLICATION "SEISMIC RESTRAINT MANUAL" AND SPECIFICATIONS.

US Army Corps of Engineers ®
Alaska District

CONTRACT NO. _____ STATE _____
CONTRACTOR _____ CITY _____
Recommended: _____ Approved: _____ Date: _____
PRIME CONTRACTOR — RESIDENT ENGINEER

1	AMD05	AMENDMENT #05	2016.12.29 BTN
0	Action	READY TO ADVERTISE SUBMITTAL	2016.11.18 BTN
No.		Description	Date Appr.

Date: 2016.11.18
Dwg Scale: AS NOTED
Plot Scale: 1:1
File Name: CLR_LRDR_MCF_MECH_2015
Drawing #: AF-141-391-02
CLR039

Designed: N.PATEL
Drawn: C.DECASTRO
Reviewed: P.WU
Submitted: B.TN

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ANCHORAGE, ALASKA

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W911KB-17-R-0010
MDA656

CLEAR AFS, ALASKA
LONG RANGE DISCRIMINATION RADAR
CONSTRUCTION PACKAGE 1 - VOLUME 2
MECHANICAL PIPING, HVAC, AND BMS GENERAL NOTES

Reference number:
M-900004B

AECOM
700 G Street, Suite 500
Anchorage, Alaska 99501
907.562.3366 | AECC280

STATE OF ALASKA
49 TH
BRADLEY E. BARBO
ME 11573
11-18-16
REGISTERED PROFESSIONAL ENGINEER

RTA

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